ACADEMIA | Letters

Tacit knowledge, action, learning, and spirits of science

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Abstract

This paper was motivated by an accumulation of confusions and a wide tendency to use and abuse of biased information. The basic concepts related to knowledge, reasoning and learning are often distorted, limiting and confusing what is reasonable. These confusions and misconceptions are not passive and irrelevant because they mould behaviours and shape action, influencing methodologies and approaches, constricting practice. So, using narrative, we try to clarify things. Our motivation is the purification of basic concepts. Our conclusions can induce discussions-clarifications that can be important to the academic community. This article can be developed and extended using examples and critical reasoning. We pick up in the published literature (papers and books) a phrase, a paragraph, an idea that we consider to be wrong and doubtful, and we expose it arguing what we consider to be right. This is the process, the method to use in our research.

In this sense, we provide a structure, a structural basis to make this work extendable to other authors. This would promote an open debate about critical concepts published and so contributes to the discussion and purification of academy. We believe this article is just a starting point. This article attempts to lift the dust and refresh ideas.

Key Words: Tacit knowledge, action, learning, abduction, Popper

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Introduction

We try to clarify concepts, notions, ideas, and that is the main purpose of this paper. "In a world deluged by irrelevant information, clarity is power" (Harari, 2019, pp 1). In such a world science is very important. Data is very important. Reflection and thought are very important. Experience is only important and relevant if we can reflect on what happened, if we can correct mistakes and appoint new and innovative paths. Reflection about specific experiences, good, or bad, is always important. Scientists tend to assert that knowledge derives from scientific activity, but this presumption often installs biased sensemaking. In fact, it is not true. Life is about producing knowledge, learning with personal experience, try and error, rethink in different angles. And we are not always playing science, we are just living, or surviving.

In fact, we construct knowledge, through different activities, experimenting, experiencing, and reflecting. Activities can vary, but reflecting about them would always be the core of our learning processes, the process in which we create knowledge. Knowing is not about being able to answer silly questions in contests and knowing weird facts and speculations, knowledge is about doing. If you are able to do, to act, you are acting because of your knowledge.

We usually consider deduction and induction to be central in our mind operations. They are. Deduction is a move from the general to the specific, and induction, which is not the opposite, is a move from the specific, eventually many different specifics, to the general. Deduction is the strong face of rationalism, a reflex from Cartesianism. And because this is true, people think that to design and develop serious reflections one needs to be a rationalist. That is not the case, a lot of discoveries were due to induction, and to combinations of inductive reasoning with deductive reasoning's. We mix emotion and reasoning, rational and intuition, something neuroscientists consider essential (Damasio, 2012). Not always rational, not always emotional, usually we need both. As well as we can see things when we walk a path in one sense and we discover different things when we walk the same path in the opposite sense, knowledge is a domain of exploratory paths, it constructs exploring new paths and the same path in different ways. Exercising different ways of looking at things we are going deeper in our analyses and further in the creation of knowledge.

Knowledge creation is like the layers of an onion. It develops in concentric and sometimes eccentric cycles. Knowledge is developed by deduction, as it is developed by induction, and certainly it can be developed by abduction, as we would see next. The same about the processes used, they can be rational, or they are driven by intuition, by educated guesses. Sometimes, or even always, knowledge is powered by both emotion and reason.

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Abduction is a different process of reasoning that also goes from "the particular" to the

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general, but "the particular" is not a huge collection of data prepared to be analyzed by statistics, algorithms and models. In abduction, "this particular" is a small set of specific and significant data, that anchors our reasoning. Abduction is the process used by doctors when they diagnose, or by detectives when they try to resolve a criminal case, and by experts when they work. Abduction is an "inference to the best explanation".

Science uses the three reasoning strategies, deduction, induction and abduction, as well as it uses rational approaches, always spiced either by intuition or abduction, or even both. But the non-scientific reasoning is the same, it also uses the same strategies. So, this is not the distinction from what is and what is not scientific.

Science is above all a discipline, a way of organizing thinking, a method, a behavior towards phenomena, a framed space of reasoning and knowledge creation, a space in which we have no opinions, or if we have, they are strongly supported by facts, by structured evidence.

Scientific knowledge is objective, has empirical evidence, it is replicable, verifiable and public. Knowledge is also accumulative and tends to organize in paradigms. Scientific knowledge should contribute to solve key societal and organizational problems, inspire cooperation, explore opportunities. With an inquiry nature, the scientific spirit is focused in the discovery of new things and realities, in developing new tools, new technologies, new methodologies, and frameworks to explore the new.

In philosophy of science and epistemology, the discussion on how to distinguish between science, and non-science is called the *demarcation problem*. The demarcation problem, examines the lines between science, pseudoscience, and other human activities, like gaming, art and literature.

Inherited from Popper conceptual landscapes, falsifiability, or refutability, can be useful in identifying science from non-science. This according to the refutation principle conceived by Karl Popper (1959). Popper with his work preached some nails in the coffin (Latour, 1993) of positivism, the dominant paradigm in science. In fact, it is impossible to make all the necessary tests to prove the validity of a sentence (a law, a rule), but, by the contrary, it is very possible to deny that the sentence is right if you find only one exception to the rule. Popper proposed we should "accept with some reserve" a rule we want to prove and we should invest our effort in trying to find examples that contradicts that rule. If you succeed, the rule is wrong, if you don't succeed in proving the rule is not valid, so it means that it maybe is valid. In the dominant scientific paradigm of positivism, testing the theory tries to prove the theory is right, in Popper's refutation theory, the researcher tries to prove the theory is wrong.

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Purpose

To figure out our main ideas and thoughts we propose an exercise. A critical assessment of things we read in published literature, papers, or books. Our method is simple, we choose a paragraph, a word, an idea, in a published text and if it is the case we contest the meaning. This would create a critical movement for contesting ideas and concepts that seam misleading. Concepts that we consider that can be wrongly interpreted, or poorly expressed. If these concepts are well choose we are creating a dynamic of purifying concepts. We are working for science. Publishing this kind of critique creates a dynamic of rethinking and debate that can innovate the academy.

For example, when we read "*Scientists and critical thinkers always use logical reasoning. Logic allows us to reason correctly*" (Schafersman, 1997), we are in very limited grounds. When we read "scientists use observation, *hypotheses, theory, laws and deduction to make these conclusion*s" (Buchdahl, 2020) we are inside a fallacy. So, the idea would be to deconstruct and explain, as we did in this text.

Conclusions

If misconceptions and conceptual errors abound in academic literature, we cannot even imagine what happens in spaces of social networks with no reviewers at all. This paper can open a practice of criticizing other papers in a way that is a timeless reviewing process.

Motivating and promoting debate is usually, not always, clarifying. So, this call for revisiting papers already published could be a good idea in this sense. It would be a purification (Latour, 1993). That wouldn't be a direct critic to the authors and to what is already done and published, it would just be a generalized debate on reinvention.

This experience needs a very solid and competent set of reviewers that somehow can keep being demanding and flexible. It requires a very special touch and a very good common sense. So, we are not only addressing authors, but editors and journals that would work to keep this idea productive and innovative.

References

Buchdahl, G., 2020, Induction and Scientific Method, Mind, vol. 60, no. 237, 1951, pp. 16–34. JSTOR, www.jstor.org/stable/2251396. Accessed 4 Nov. 2020.

Damasio, Antonio, 2012, Self Comes to Mind: Constructing the Conscious Brain, RHUK

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Citation: Figueiredo, J. (2021). Tacit knowledge, action, learning, and spirits of science. *Academia Letters*, Article 1701. https://doi.org/10.20935/AL1701.

Harari, Yuval Noah, 2019, 21 Lessons for the 21 Century, Vintage, Penguin Random House, UK

Latour, Bruno, 1993, We Have Never Been Modern, Harvard University Press Cambridge, Massachusetts

Popper, Karl Raimund, 1959, The Logic of Scientific Discovery, First English edition published 1959 by Hutchinson & Co.

Schafersman, Steven D., 1997, An Introduction to Science, Scientific Thinking and the Scientific Method, Miami University

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